

## Oracle Database 11g: Advanced PL/SQL

**Duration:** 3 Days

### What you will learn

In this Oracle Database 11G Advanced PL/SQL training, expert Oracle University instructors will help you explore the advanced features of PL/SQL to design and tune PL/SQL. You'll learn how it interfaces with the database and other applications in the most efficient manner.

Learn To:

- PL/SQL designing best practices.
- Create PL/SQL applications that use collections.
- Implement a virtual private database with fine-grained access control.
- Write code to interface with external C and Java applications.
- Write code to interface with large objects and use Secure File LOBs.
- Write and tune PL/SQL code effectively to maximize performance.

### Benefits to You

Extend the functionality of the SQL language with PL/SQL language to write application code. This will help your organization realize the full benefit of utilizing Oracle best practices.

### Virtual Private Database

You'll also be introduced to Virtual Private Database (VPD) to implement security policies. Learn techniques and tools to strengthen applications against SQL injection attacks. Explore programming efficiency, use of external C and Java routines, PL/SQL server pages and fine-grained access.

### Audience

Application Developers  
Database Administrators  
PL/SQL Developer

### Related Training

#### *Required Prerequisites*

Knowledge of SQL  
PL/SQL Programming experience  
Oracle Database: Introduction to SQL

## **Course Objectives**

Design PL/SQL packages and program units that execute efficiently  
Write code to interface with external applications and the operating system  
Create PL/SQL applications that use collections  
Write and tune PL/SQL code effectively to maximize performance  
Implement a virtual private database with fine-grained access control  
Write code to interface with large objects and use Secure File LOBs

## **Course Topics**

### **Introduction**

Course objectives  
Course agenda  
Tables and data used for this course  
Overview of the development environments: SQL Developer, SQL Plus

### **PL/SQL Programming Concepts Review**

Identify PL/SQL block structure  
Create procedures  
Create functions  
List restrictions and guidelines on calling functions from SQL expressions  
Create packages  
Review of implicit and explicit cursors  
List exception syntax  
Identify the Oracle supplied packages

### **Designing PL/SQL Code**

Describe the predefined data types  
Create subtypes based on existing types for an application  
List the different guidelines for cursor design  
Cursor variables

### **Using Collections**

Overview of collections  
Use Associative arrays  
Use Nested tables  
Use VARRAYs  
Compare nested tables and VARRAYs  
Write PL/SQL programs that use collections  
Use Collections effectively

### **Manipulating Large Objects**

Describe a LOB object  
Use BFILEs  
Use DBMS\_LOB.READ and DBMS\_LOB.WRITE to manipulate LOBs  
Create a temporary LOB programmatically with the DBMS\_LOB package  
Introduction to Secure File LOBs

Use Secure File LOBs to store documents  
Convert Basic File LOBs to Secure File LOB format  
Enable deduplication and compression

### **Using Advanced Interface Methods**

Calling External Procedures from PL/SQL  
Benefits of External Procedures  
C advanced interface methods  
Java advanced interface methods

### **Performance and Tuning**

Understand and influence the compiler  
Tune PL/SQL code  
Enable intra unit inlining  
Identify and tune memory issues  
Recognize network issues

### **Improving Performance with Caching**

Describe result caching  
Use SQL query result cache  
PL/SQL function cache  
Review PL/SQL function cache considerations

### **Analyzing PL/SQL Code**

Finding Coding Information  
Using DBMS\_DESCRIBE  
Using ALL\_ARGUMENTS  
Using DBMS\_UTILITY.FORMAT\_CALL\_STACK  
Collecting PL/Scope Data  
The USER/ALL/DBA\_IDENTIFIERS Catalog View DBMS\_METADATA Package

### **Profiling and Tracing PL/SQL Code**

Tracing PL/SQL Execution  
Tracing PL/SQL: Steps

### **Implementing VPD with Fine-Grained Access Control**

Understand how fine-grained access control works overall  
Describe the features of fine-grained access control  
Describe an application context  
Create an application context  
Set an application context  
List the DBMS\_RLS procedures  
Implement a policy  
Query the dictionary views holding information on fine-grained access

## **Safeguarding Your Code against SQL Injection Attacks**

SQL Injection Overview

Reducing the Attack Surface

Avoiding Dynamic SQL

Using Bind Arguments

Filtering Input with DBMS\_ASSERT

Designing Code Immune to SQL Injections

Testing Code for SQL Injection Flaws